Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Transition from TTY to Real-Time Text Technology	)	CG Docket No. 16-145
	)	
	)	
Petition for Rulemaking to Update the Commission's Rules for Access to Support the Transition from TTY to Real-Time Text Technology, and Petition for Waiver of Rules Requiring Support of TTY Technology	)	GN Docket No. 15-178

REPLY COMMENTS OF
Rehabilitation Engineering Research Center on Tech. for the Deaf and Hard of Hearing
Rehabilitation Engineering Research Center on Universal Interface and IT Access
Omnitor
Telecommunications for the Deaf and Hard of Hearing, Inc.
National Association of the Deaf
Hearing Loss Association of America

Rehabilitation Engineering Research Center on Technology for the Deaf and Hard of Hearing (DHH-RERC), Rehabilitation Engineering Research Center on Universal Interface and IT Access (UIITA-RERC), Omnitor, Telecommunications for the Deaf and Hard of Hearing, Inc., National Association of the Deaf, and Hearing Loss Association of America respectfully reply to comments filed on the Federal Communications Commission's ("FCC" or "Commission") December 15, 2016 Further Notice of Proposed Rulemaking in the above-captioned proceedings ("FNPRM").[1]

[1] *Transition from TTY to Real-Time Text Technology*, Report and Order and Further Notice of Proposed Rulemaking, FCC 16-196, CG Docket No. 16-145, GN Docket No. 15-178 (Dec. 16, 2016) ("FNPRM").

I. RTT Compatibility with TRS

Some commenters oppose the adoption of any requirements for TRS integration,[2] with Sorenson claiming that competition alone will lead to providers offering services that are adequately accessible.[3] While we believe that the mechanisms for providing TRS need to be flexible enough to allow full support of the technical innovations that RTT brings, we reemphasize the importance of integrating RTT into TRS, and again stress the importance of clear functionality requirements for carriers and TRS providers, such as speed of answer, typing speeds, confidentiality, and all the other typical TRS requirements.[4]

A. Use cases for RTT

We would like to highlight some real-time text use cases and indicate where relay service support for RTT would be beneficial and why. We list the outbound call scenarios, but analogous scenarios exist for incoming calls.

1. Calls from a videophone or special captioned telephone to a RTT user

We disagree with assertions that RTT integration in VRS[5] and IP-CTS[6] will not improve accessibility. If a customer receiving a call uses RTT to communicate on their phone, with or without voice, and types responses back to the VRS/IP-CTS user, these responses should be

[2] *See* CTIA Comments at 6; Sorenson Comments at 6.
[3] Sorenson Comments 6.
[4] *See* DHH-RERC, *et al.* Comments at 9-11.
[5] *See* Sprint Comments at 2. We agree with Sorenson that RTT can "yield incremental consumer benefits" for services like VRS. Sorenson Comments at 4.
[6] Several commenters have suggested that integration of RTT into CTS would not improve the service. *See* Sprint Comments at 2-3; Hamilton Relay Comments at 6-7; ClearCaptions Comments at 2. The opposition to RTT incorporation in VRS and IP-CTS fails to fully recognize the role that relay services play in the transition from PSTN to IP-based telecommunications and also overlooks the requirements of emergency calls, specifically with respect to NG9-1-1 and the NENA i3 specification.

passed through directly. The alternatives are either (1) the interpreter/CA is required to read the received RTT and transmit the text back, or (2) a second relay service that first converts the RTT to voice must be involved in a chain. In both scenarios, there will be additional cost – either because the interpreter/CA will have to perform additional work compared to a normal call scenario, or because a second relay service will need to be involved. Technical changes that allow all TRS equipment to interoperate with the RFC4103 safe harbor would be cheaper in the long run, and would address various concerns of stakeholders and the FCC regarding the long-term sustainability of relay services.

We also note that end-to-end RTT support in VRS and IP-CTS[7] equipment comes closer to achieving the principle of functional equivalence. If a hearing person can use one phone to call everyone, regardless of what type of phone the other side uses, then the same should be true for people who are deaf, hard of hearing, or speech-disabled. Unless RTT is supported end-to-end, a VRS or IP-CTS user would need to have a second phone ready to use just for the purpose of communicating with an RTT user.

2. Emergency calls

Currently, only the voice component of relay service users' 9-1-1 calls are recorded. The NENA i3 specification for NG9-1-1 allows for recording and logging of all media streams that are present in an emergency call to a NG9-1-1 PSAP. This logically also extends to all media streams that are being used by VRS users (including the video), and by IP-CTS users (the

[7] Note that in our comments, we have used the term CTS as a generic term for all forms of captioned telephony, no matter whether it is transmitted over an analog phone line or over the Internet. *See* DHH-RERC, *et al.* Comments at 13-16. We recognize that in future all-IP-based telecommunications, all captioned telephony will be IP-based, and thus our comments with respect to captioned telephony should be interpreted to mean captioned telephone services in an all-IP world.

captions). The FCC Emergency Access Advisory Committee (EAAC) also recognized this need in its report, specifically in recommendation P5.2:

> Recommendation P5.2: Equal Protection: The EAAC recommends that the FCC, working with the DOJ as appropriate, adopt rules that would ensure that individuals with disabilities calling NG9-1-1 have the same privacy, security, and monitoring safeguards as well as evidentiary records as individuals without disabilities who call NG9-1-1.
>
> Note: It is understood that these same levels may not be possible with interim text solutions as discussed above. Multimedia conferencing via PSAP should be recorded *across all media*.[8]

With respect to captions, meeting the requirement of recording across all media is possible only if IP-CTS providers adopt support for RTT standards in their service. The NENA i3 specification for NG9-1-1 already specifies RFC4103 as the standard to use, which is the same as the safe harbor standard for the RTT rules. If for no other reason, it is for NG9-1-1 calling that RTT support in IP-CTS cannot be optional.

3. The ability to use any phone

One of the great promises of RTT is the ability to call anyone, anywhere, using any phone. This also extends specifically to IP-CTS. A hearing person is able to use any public phone, any hotel phone, any conference phone, or any phone mandated in a corporate environment, and is able to borrow a wireless phone from anyone with the assurance that it will meet their needs. They can even grab any phone to make an emergency call in a pinch. To date, the same has not been possible for captioned telephony, due to the need for special equipment or apps to support captioned phone calls. If RTT is ubiquitously available, however, the possibility arises that captioned telephone services can be provided to any phone, not just special equipment

[8] Emergency Access Advisory Committee (EAAC) Report and Recommendations, Dec. 6, 2011, at 26-27 § 5.1(V), https://apps.fcc.gov/edocs_public/attachmatch/DOC-312161A1.pdf (emphasis added).

or apps. This greatly improves functional equivalence, as it increases the range of phones from which captioned calls can be made. It also works around problems where corporate or IT security policies mandate the use of specific secure equipment. If such equipment supports interoperable RTT, it also is capable of supporting captioned telephone use cases – and gives workers access to captioned telephony in places where it previously would have been barred.

Note that we fully support the use of special captioned telephones, with user interfaces tailored to the needs of people who are deaf or hard of hearing, and do not believe that they should be removed from the market. Rather, we believe that, by supporting interoperable RTT, IP-CTS providers expand the availability of the service to situations where it was impossible to get access before – and this improves functional equivalence.

We also wish to emphasize that at this point, it is important to provide support for interoperable RTT as the *transport protocol for text and captions (i.e. captions are sent via RFC4103)*, so that the full potential of future applications for RTT can be realized. Whether and how RTT from someone who types should, for example, be presented in the user interface of a captioned telephone, is a question that is beyond the scope of this rulemaking, and can be addressed once full RTT interoperability on the transport level has been realized.

We also acknowledge that captioned telephone service providers may be concerned about features for transmitting metadata, edits, and other features unique to special captioned telephones and apps. We note that T.140, the text presentation layer underlying the RFC4103 safe harbor standard, has a mechanism for extensions. It would be no problem for providers to make use of this extension mechanism to transport any additional information they need to provide for their equipment and apps. We also respectfully suggest that stakeholders convene to standardize these extensions to T.140 in the future for global use.

From a technical standpoint, there appears to be no reason why captions could not be transported via RFC4103 instead of the current proprietary mechanisms employed by providers. Doing so, as noted in this section, would greatly expand the availability of the service to people who need it—on any phone. It would also take full advantage of the resiliency of RFC4103, and the expected support for unimpeded transmission in all-IP telephone networks, even with the strictest of firewalls.

4. Double feedback captioning and speech recognition

A particularly promising use case for RTT is double feedback captioning and speech recognition. In this application, both the speaker and the receiver can see what the captioner or speech recognition system is putting out. This requires an ability for any hearing speaker to receive and see the captions, if so desired, through RTT. This application offers the following potential benefits:

- The speaker can catch and re-speak (or type) anything that the captioner or speech recognition gets wrong.
- The receiver can touch anything in the captions they do not understand – and have it highlighted for the speaker to resay or to use different words to make it clearer to the receiver.
- Speech recognition can be used where errors would otherwise prevent accurate communication.
- Older adults who can talk but cannot type or type well will benefit from easier communication.
- Users of any text-based relay will also benefit from better accuracy and self-correction.

While this type of application requires further research and development of details, a variant has already been tested in practice via crowd-sourced caption correction.[9] At this stage, the most important issue is to support RTT transport across TRS – including VRS and IP-CTS – to make such applications possible. If RTT is not fully interoperable in the TRS ecosystem, none of these benefits can ever be realized.

5. Application servers

One frequently-touted benefit of all-IP communication systems, and specifically IMS, on which wireless RTT runs, is the possible implementation of application servers.[10] This allows a multitude of services to run on the phone network that provide a range of interesting and useful applications. Some simple examples include calling for the current time and multimedia conference bridges. But we can easily imagine more sophisticated services, such as language translation, including translation of captions. The inclusion of RTT offers further opportunities for better user experiences with application servers, such as in the case of translating written text or telephone menu trees. Right now, a user must patiently listen for each option over voice before finding the correct one (e.g., press one for payments, press two for inquiries, press three for current balance, etc.). RTT offers the ability to transmit all options for the caller to read at once, substantially shortening the time it takes to decide what option to select.

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[9] *See* Rebecca Parks Harrington & Gregg C. Vanderheiden, *Crowd Caption Correction (CCC)*, ASSETS '13: Proceedings of the 15th International ACM SIGACCESS Conference on Computers and Accessibility, Article No. 45, Oct. 21, 2013.

[10] *See* Ericsson, *Ericsson Multimedia Telephony Application Server*, https://www.ericsson.com/ourportfolio/products/multimedia-telephony-application-server?nav=productcategory002%7Cfgb_101_432; Steve Apiki, *JSR 289: SIP Servlet 1.1 Provides Significant Benefits for SIP Appliction Developers*, https://www.devconnectprogram.com/fileMedia/download/04fdf1b8-4c19-47a7-b12d-1c67cc9dfd89.

All of these benefits offered through application servers will be available to mainstream telephone users. Unless TRS supports interoperable RTT, this will be lost to them, hurting functional equivalence.

B. Summary of why RTT must be included in TRS end-to-end

In short, full RTT integration into TRS offers a level playing field where people who are deaf, hard of hearing, or speech-disabled get the same access and options as the mainstream. Stopping short of this and allowing relay service providers to carve out exemptions means that the full potential of RTT will not be realized.

We also wish to emphasize, again, the need for RTT on the side of the deaf, hard of hearing or speech-disabled caller. We agree with Sorenson's assertion[11] that "RTT can yield incremental consumer benefits" for services like VRS, as "it may be useful at times for the deaf consumer to use text" to transmit addresses or specific terms "that may be difficult to sign." Similar considerations apply to other forms of TRS beside VRS.

C. The need for one-step calling

We also want to emphasize our position, as stated in our initial comments, that there is an urgent need to introduce the one-step calling concept to improve accessibility of the text relay services beyond the two-step calling model available in 711 TRS.[12]

[11] Sorenson Comments at 6.
[12] DHH-RERC, *et al.* Comments at 12.

II. TTY Interoperability Sunset Date

Some groups support the Commission's proposed 2021 sunset date,[13] arguing that the fixed date "will help smooth and encourage" the transition from TTY to RTT[14] and would allow PSAPs to "adopt RTT-capable equipment and systems" and "test their equipment and systems with wireless service providers."[15] These commenters also oppose imposing any reporting requirements on providers.[16]

Contrary to assertions that a 2021 sunset date would be adequate to transition emergency services, several organizations representing 9-1-1 service providers explain why a sunset date should not be set until the Commission has adequate data concerning RTT adoption and remaining TTY use. NASNA explains that the timeframe presented by a 2021 sunset date is "likely not enough time" to ensure compatibility.[17] NASNA suggests that the TTY sunset date should be reassessed after "the transition of *all* customers to IP-based wireless and wireline networks."[18] BRETSA expressed concern that basing a sunset date solely on RTT availability and market penetration would ignore the potential that some "deaf and hard-of-hearing individuals will still rely on TTY."[19]

Similarly, Texas 9-1-1 entities argue that the Commission should only adopt a sunset date once it has gathered information on the extent of full RTT-to-RTT deployment for 9-1-1 service and changes in responsibilities for stakeholders involved in 9-1-1 service in the absence of a

[13] AT&T Comments at 2-3; CTIA Comments at 3.
[14] CTIA Comments at 3-4.
[15] AT&T Comments at 1-2.
[16] AT&T Comments at 2; CTIA Comments at 9.
[17] NASNA Comments at 3.
[18] *Id*.
[19] BRETSA Comments at 2.

backward compatibility requirement.[20] We reiterate our opposition to the adoption of a 2021 sunset without significant data on the extent of RTT adoption and continued reliance on TTY.

III. Conclusion

We appreciate the involvement of all representatives in this important proceeding and look forward to future collaboration and consensus building between government, industry, academics, and consumer advocacy groups to address future RTT research and development, and continuing to work in cooperation with all stakeholders to ensure that consumers who are deaf, hard of hearing, and speech-disabled have access to communications on equal terms.

Respectfully submitted,

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[20] Texas 9-1-1 Entities Comments at 3.

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